



ATTACHMENT 2
UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

8005140473

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January 25, 1978

Docket No. 50-267

Public Service Company of Colorado
ATTN: Mr. C. K. Millen
Senior Vice President
P. O. Box 840
Denver, Colorado 80201

Gentlemen:

On the morning of January 23, 1978 the Fort St. Vrain Nuclear Station experienced an uncontrolled release of gaseous radioactivity which was caused by a failure of the buffer seal system associated with the helium circulators. The reactor was subsequently shutdown due to high moisture content in the reactor coolant system. The consequences and causes of the incident have been the subject of considerable evaluation by your organization, the NRC and other state and federal agencies.

This letter will confirm the telephone conversation on January 25, 1978 between you and Mr. W. C. Seidle of this office in which you agreed that Public Service Company of Colorado will not resume operation of the Fort St. Vrain facility until the event has been fully evaluated and NRC agrees that operation may resume.

If your understanding of this matter is inconsistent with the above, please notify us within 24 hours.

Sincerely,

E. Morris Howard
Director

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

ATTACHMENT 3

ON-SITE SEQUENCE OF EVENTS

Prior to the sequence of events which follows, the plant was operating at 68% power and all plant systems appeared to be normal. All counts are counts per minute.

| <u>TIME (MST)</u> | <u>SEQUENCE OF EVENTS (1/23/78)</u> |
|-------------------|---|
| 0907 | Bearing Water Surge Tank, T-2105, level increase noted. Fill valve LV-2136-1 failed open due to fault in associated controller. Dump valve LV-2136-2 associated with this same controller failed closed. It also appears that the backup dump valve failed to open. |
| 0907:21 | "D" Circulator tripped on Negative Buffer/Mid-Buffer due to rapid increase in surge tank level. This admitted H ₂ O into the Primary System. Bearing Water Accumulators fired for reasons unknown (Loop 2). "C" Circulator Buffer/Mid-Buffer Negative but does not trip because it is inhibited due to trip of "D" Circulator. Turbine runback to 50% power occurred concurrently. |
| 0908:51 | "B" Circulator tripped on Negative Buffer/Mid-Buffer due to apparent flooding of Buffer return line. |
| 0910:16 | Reactor Scram (Two Loop Trouble Moisture Scram). Steam Water Dump inhibited as a result of Buffer/Mid-Buffer trips. |
| 0910:30 | "A" Circulator Buffer/Mid-Buffer went negative. Trip inhibited due to previous trip of "B" Circulator. "C" HP Separator flooded. |
| 0914 | "A" Circulator Buffer/Mid-Buffer went High-Positive. Primary helium now down the shaft. "A" HP separator starts to flood. |
| 0918:15 | "C" Circulator Steam Turbine manually tripped. |
| 0920:06 | "C" Circulator Brake and Static Seal set. (NOTE: "C" Circulator operated for approximately 12.5 minutes with a Negative Buffer/Mid-Buffer.) |

| <u>TIME</u> | <u>SEQUENCE OF EVENTS (1/23/78)</u> |
|-------------|--|
| 0921 | "A" Circulator Buffer/Mid-Buffer varies from pegged high (positive) and pegged low (negative) over the next ten minutes. (Approximately 3 minutes negative and approximately 6 minutes positive.) |
| 0925 | "A" HP separator starts to return to normal level. |
| 0928 | Loop II Surge Tank Level coming down as a result of agitating controller internals. |
| 0929 | "A" HP Separator level normal. |
| 0907-0930 | Plant personnel shutdown Helium Recovery Compressors sometime concurrent with the high moisture at the dryer. These compressors were probably already isolated due to high water level in the LP separator. The shutdown and/or isolation of the Helium Recovery Compressors is significant in that this then allowed pressurization of the LP separator due to regenerative flow back through the dryer that was being regenerated. The primary helium entering the buffer system then had a path through the LP separator relief valves into the Reactor Building. Sometime in this period, or immediately after, the relief valve (21108) on the helium dryer lifted due to apparent flooding of the dryer which ruptured the sealing rupture disc for the relief. Subsequent post incident testing indicates the valve experiences leakage at 50 psig. |
| 0930 | Liquid Waste Monitors (RT 6212 and 6213) elevation 4771 are first to show increase (55 counts BDG to 90 counts and 90 counts BKG to 140 counts, respectively). "A" Circulator Buffer/Mid-Buffer pegs high positive and remains there for the next 69 minutes. |
| 0930-0935 | Personnel reported to be alarming Reactor Building Portal Monitors on exit from Reactor Building. |
| 0935 | Stack Iodine Monitor (RT 7325-1) showing increase (30 counts BKG to 280 counts.) Personnel evacuating Reactor Building. No emergency alarm had been sounded. (GAI-Tronics announcement made.) |

| <u>TIME</u> | <u>SEQUENCE OF EVENTS (1/23/78)</u> |
|-------------|---|
| 0940 | RT 6212 now reading 1800 counts. LP Separator monitor (RT 21251) showing increase (70 counts BKG to 10,000 counts). RT 6213 now reading 140 counts. |
| 0945 | Radiation Monitors Showing Increase RT 7325-1 380 counts RT 21251 32,000 counts Air Ejector Exhaust Monitor RT 31192 (50 counts BKG to 100) Gas Waste Compressor Cooling Water RT 46211 (160 counts BKG to 500 counts) RT 6212 4,000 counts RT 6213 4,000 counts Reactor Building Liquid Monitor RT 40212 (100 counts BKG to 180 counts) |
| 0930-0945 | <u>Calculations</u> <ol style="list-style-type: none">1. Iodine¹³¹/RT 7325-1 - Data from this monitor indicated 7 Rem in one hour to the thyroid at one mile.2. Stack Noble Gas Monitor/RT 7324-1. Off-site Noble Gas 2.7 E-07 Rem in one hour at one mile. |
| 0950 | Time all personnel were shown to be logged out of the Reactor Building. Emergency Alarm Sounded (Emergency Director's Log). |
| 0955 | Announced Site Evacuation (GAI-Tronics), Emergency Director's Log entry. |
| 1000 | Buffer Helium return flow valve (FV-2171) on "A" Circulator throttled to reduce the loss of helium primary down shaft. (Buffer/Mid-Buffer still high.) |
| 1010 | Establishing valve line-ups to bring "B" Circulator on the line. |
| 1014 | Notifications by Plant. <ol style="list-style-type: none">1. Weld County Communications Center Clock Recorder.2. PSC Operator |

TIME

SEQUENCE OF EVENTS (1/23/78)

1010-1020

Reactor Monitoring Peaking

| | |
|-----------|---------------|
| RT 7323-1 | 1,200 counts |
| RT 6212 | 8,500 counts |
| RT 6213 | 7,500 counts |
| *RT 21251 | 50,000 counts |
| RT 31193 | 45,000 counts |
| RT 7324-1 | 2,000 counts |

*This monitor continued to climb until 1110 with peak of 240,000 counts.

Area Monitors Reactor Building

Indicate less than 3 mRem/hr. Team Surveys indicate levels of 15 mRem/hr (Survey Team instruments sensitive to soft Beta). Although site evacuated, selected HP personnel remained on site to do surveys and to escort Operations personnel.

1020

Some personnel started to establish Control Center at Visitor Center. (NOTE: This was contrary to instructions put out over GAI-Tronics to all personnel.)

1025

Ed Hill, Operations Supervisor, directed personnel at Visitor's Center to evacuate to Johnstown.

1030

High Pressure Helium Bottles valved in to assist in blowdown of instrumentation.

1030

Don Alexander, Senior Health Physicist, called State Health Department. PSC was informed that this was the first notification that the State Health Department had received of the incident.

1035

Region IV was notified by the PSC Operator.

1039

Buffer/Mid-Buffer on "A" Circulator returning to normal. Indication of Buffer/Mid-Buffer erratic.

1040

"B" Circulator tripped on releasing brake and static seal. Trip due to indicated loss of Bearing Water. Trip apparently spurious.

TIMESEQUENCE OF EVENTS (1/23/78)

1045 "B" Circulator reset brake and seal. Circulators again tripped. Pulled XCR-93153B to preclude further spurious trips. ("B" Logic Module for loss of bearing water trip.)

1040 Weld County Sheriff arrived at Johnstown.

1100 Helium Dryer isolated. This was concurrent with peaking of LP Separator Radiation Monitor RT 21251 at 1110. This action should have stopped the flow of primary Helium to the Dryer and LP Separator. Some primary Helium could still be entering "A" Circulator Buffer System as Buffer/Mid-Buffer indication was erratic.

1113 Johnstown Control Center notified that release was under control, and that the monitors were clear. Wind was 12 miles/hr from 78°.

1115 "B" Circulator at speed on Emergency Feedwater with normal Buffer/Mid-Buffer.

1117 "A" Circulator shutdown.

1121 "A" Circulator Brake and Static Seal set. All primary helium flow-out of PCRV should have ceased.

1125 Survey team sent out to make additional off-site measurements.

1127 PSCO (Johnstown Control Center) notified Colorado State Health Department that release lasted one-half hour at 6.67 Ci per sec. Colorado Health Department did not advise evacuation. This release rate was later revised.

1130 Second Calculation

Calculations made at this time resulted in downgrading the incident from a Category II to Category I on the results from the following monitors.

1. Iodine

RT 7325-1 - Exclusion Area Boundary 2.2 rem in one hour, 1 mile/3.9 rem in one hour, and 2 miles/1.98 rem in one hour.

2. Noble Gas

RT 7324-1 <E-06 Rem in one hour
RT 7324-2 <E-06 Rem in one hour

| <u>TIME</u> | <u>SEQUENCE OF EVENTS (1/23/78)</u> |
|-------------|---|
| 1139 | Personnel (2) arrive at Johnstown from State Health. |
| 1200 | Representative Colorado Division of Emergency Services arrived at Johnstown. "A" Helium Recovery Compressor started to reduce pressure in LP separator (50 psig). |
| 1212 | "A" Helium Recovery Compressor stopped. LP separator pressure 5 psig. |
| 1220 | Survey Team reported area around plant is clear of radioactivity and contamination. |
| 1227 | Press release, "No excess radioactivity at plant site." (This was Emergency Director's Log entry, contents of actual release unknown at this time.) |
| 1240 | Johnstown (Controller) gave permission for personnel to report to Visitor's Center. |
| 1355 | Survey results indicate OK to return cars into plant parking lot. |
| 1429 | PSC personnel allowed to return to their plant stations with exception of reactor building. (Johnstown Controller) |
| 1500 | Removed RT 7325-1 Charcoal Cartridge. |
| 1600 | Analysis for RT 7325-1 Cartridge indicated that 2.34 E-04 uCi ¹³¹ I was released thru plant vent. (NOTE: This value was corrected to 4.68 uCi on 1/24/78.) |
| 1630 | Noble Gas Stack Monitor RT 7324-1 calculations show integrated release of 4 curies. |
| 1800 | Region IV inspectors arrive on site. |